

Claims

1. Safety device (45), in particular a beam emitting and beam receiving device, for a manufacturing machine (1), e.g. a folding press, with at least one retaining mechanism (51) designed in the form of an adjusting mechanism (52) for the safety device (45) on a press beam (15, 16) which can be fitted with bending tools (36, 37) in a tool mounting device (35), whereby the adjusting mechanism (52) holds, in a relatively adjustable manner relative to the press beam (15, 16), the beam emitter (47) and/or beam receiver (48) in a direction running perpendicular to a standing surface (9) between at least one working position (55) and a park position (54) in a guiding arrangement (63), characterised in that the adjusting mechanism (52) has a guiding and locking device (62) switching a locking element (79) of a locking device (77) between a released position and a retained position, and the retaining mechanism (51) for the beam emitter (47) and/or the beam receiver (48) automatically locks in relation to the press beam (16) in the park position (54) upon a linear displacement in a direction opposite to the working plane (14) on reaching the park position (54).
2. Safety device (45) according to claim 1, characterised in that the guiding and locking device (62) is arranged on the adjustable press beam (16) in a stationary manner.
3. Safety device (45) according to claim 1, characterised in that the guiding and locking device (62) is arranged on the retaining mechanism (51) in a stationary manner.
4. Safety device (45) according to one of the preceding claims, characterised in that the locking element (79) in the guiding and locking device (62) is arranged to be adjustable in a direction running perpendicular to the retaining mechanism (51).
5. Safety device (45) according to one of the preceding claims, characterised in that the locking element (79) is arranged in a guide housing (78) arranged in a bore (76) of a housing (74) of the guiding and locking device (62).
6. Safety device (45) according to one of the preceding claims, characterised in that the locking element (79) is adjustably mounted in the guide housing (78) by means of a sliding guide (82).

7. Safety device (45) according to one of the preceding claims, characterised in that the locking element (79) is pretensioned by means of a spring arrangement (80), e.g. a compression spring, acting between the locking element and the guide housing (78) projecting over a side surface (81) of the housing (74) in the direction of a stop and switching means (86).
8. Safety device (45) according to one of the preceding claims, characterised in that the stop and switching means (86) is secured onto the retaining mechanism (51).
9. Safety device (45) according to one of the preceding claims, characterised in that the stop and switching means (86) is secured onto the press beam (16).
10. Safety device (45) according to one of the preceding claims, characterised in that a guide rail (66) for the guiding and locking device (62) is connected moveably with the press beam (16).
11. Safety device (45) according to one of the preceding claims, characterised in that the guide rail (66) is connected moveably with the retaining mechanism (51).
12. Safety device (45) according to one of the preceding claims, characterised in that the stop and switching means (86) on displacement of the guiding and locking device (62) in displacement direction forms by adjusting means (88) triggering an adjusting force in displacement direction on an end face (85) of the locking element (79) in the extension direction of a middle axis (75) against the action of the spring arrangement (80).
13. Safety device (45) according to one of the preceding claims, characterised in that an adjusting means (88) is in the form of a retaining stop (89) for supporting the locking element (79) or the retaining mechanism (51) in the direction of the standing surface (9).
14. Safety device (45) according to one of the preceding claims, characterised in that at a distance (92) measured in displacement direction of the retaining mechanism (51) from the retaining stop (89) in the direction of the standing surface (9) the additional adjusting means (88) forming a switching surface (90) running parallel to the displacement direction is arranged.

15. Safety device (45) according to one of the preceding claims, characterised in that the stop and switching means (86) forming the adjusting means (88) is in the form of a one piece sheet metal part.

16. Safety device (45) according to one of the preceding claims, characterised in that the guide rail (66) with the guiding and locking device (62) is arranged in a housing sleeve (68) formed by at least one section (67).

17. Safety device (45) according to one of the preceding claims, characterised in that at an end region (69) facing the standing surface on the housing sleeve (68) a support plate (70) aligned parallel to the standing surface (9) is arranged for the beam emitter (47) and/or the beam receiver (48).

18. Safety device (45) according to one of the preceding claims, characterised in that in the housing sleeve (68) for the transmission of energy and data lines are arranged between the beam emitter (47) and/or the beam receiver (48) and an output interface.

19. Safety device (45) according to one of the preceding claims, characterised in that the lines are laid on a line guiding chain arranged in the housing sleeve (68).

20. Safety device (45) according to one of the preceding claims, characterised in that the output interface is line-connected with the machine control system (46).

21. Safety device (45) according to one of the preceding claims, characterised in that an adjustment path of the retaining mechanism (51) starting from the park position (54) to position the beam emitter (47) and beam receiver (48) can be adapted to various working positions (55) by stop means (97), e.g. by pins (98) insertable into the guide rail (66), to different heights (99) of the bending tools (36).

22. Safety device (45) according to one of the preceding claims, characterised in that the locking device (77) is formed by a wedge element (102) mounted adjustably in the housing (74) of the guiding and locking device (62).

23. Safety device (45) according to claim 22, characterised in that the wedge element (102) can be adjusted in adjustment direction of the retaining mechanism (51) in a guide (101) of the housing (74).

24. Safety device (45) according to claim 22 or 23, characterised in that guide tracks (100) of the guide (101) for the wedge element (102) run at an angle to the adjustment direction of the retaining mechanism (51) formed by the guide rail (66).

25. Safety device (45) according to one of claims 22 to 24, characterised in that the wedge element (102) is supported in the guide (101) by roller elements (104).

26. Safety device (45) according to one of claims 22 to 25, characterised in that the wedge element (102) can be adjusted into a release position by adjusting means (108), e.g. rope pull to rope pull (109) and/or a lever element out of clamped position, in which the retaining mechanism (51) is positioned relative to the housing (74).